

STEREO MOC Status Report  
Time Period: 2016:256 - 2016:262

STEREO Ahead (STA) Status:

1. The following Ground System anomalies/events occurred during this reporting period:

- On day 258, before the DSS-15 support began, the transmitter was declared red for the duration of the track. This anomaly resulted in the loss of 3.2 hours of commanding and two way tracking data. See DR #G117468 for more information.
- On day 259, during the DSS-43 support, the ranging pre-calibration failed due to a receiver issue. This anomaly resulted in 3.5 hours of degraded ranging data. See DR #C112332 for more information.

2. The following spacecraft/instrument events occurred during this week. The Ahead observatory operated nominally during this week.

- On day 261, the Ahead observatory was used to phase calibrate the 10<sup>th</sup> uplink array, using DSS-24, 25, and 26 for 1.9 hours, to support the array use for STEREO Behind battery recovery. Due to a transmitter motor generator issue at DSS-24, the transmitter could only be calibrated to 10 kW reducing the array gain by approximately 1.6 dB. An approximate 10.4 dB gain in uplink AGC was observed in the spacecraft transponder data. No SSR playback was conducted as the phasing of the transmitters would have caused periodic dropped frames.
- On day 262, the Ahead observatory was used again to phase calibrate the 11<sup>th</sup> uplink array, using DSS-24 and 26 for 1.9 hours, to support the array use for STEREO Behind transmitter carrier recovery. Due to a transmitter motor generator issue at DSS-24, the transmitter could only be calibrated to 10 kW reducing the array gain by approximately 1.6 dB. An approximate 10.4 dB gain in uplink AGC was observed in the spacecraft transponder data. No SSR playback was conducted as the phasing of the transmitters would have caused periodic dropped frames.

- The average daily science data return for Ahead was 5.1 Gbits during this week.

STEREO Behind (STB) Status:

1. The following Ground System anomalies/events occurred during this reporting period:

- None.

2. Behind Observatory Status - Low main bus voltage, 2 (#6 & 9) out of 11 battery cells are currently not functioning, attitude uncontrolled, rotating at a ~45 second period about its principal axis of inertia. Current orientation supports some solar array input; RF communications only supports uplink of short commands to an LGA. Very limited telemetry can be received at 11.7 bps from the -Z LGA. While propellant is suspected to be frozen, both propulsion tank latch valves are open, and pressure transducer #2 is not functioning. Power switching boards are on; nearly all switched loads off with TWTA in standby and IEM (avionics) on. EA mode is enabled. The battery charge rate is C/10. As the uncontrolled communications link is degrading, necessary macro sequences are being developed to allow the peak power tracker in C&DH standby mode to protect the battery. Detailed status of the recovery activities to restore operations from the Behind loss of communication anomaly, which occurred on October 1, 2014, are listed below. Active recovery operations began with the carrier detection on August 21, 2016.

- On day 261, the 10<sup>th</sup> uplink array for STEREO Behind recovery was conducted using DSS-24, 25, and 26. The uplink array was phase calibrated to provide approximate 10.4 dB gain, as compared to a single 34m station, using the Ahead observatory first for 1.9 hours then the arrayed stations were switched to point to the Behind observatory. The configuration consisted of three 34m stations at the Goldstone complex using the 80 kW, one 20 kW, and one 10 kW transmitters repeating a 3 kHz frequency acquisition sequence with the MOC sending 20 critical commands after each sweep. 360 commands were sent for configuring the spacecraft for a low power mode by powering off excess loads, powering on all power switching boards, and ensuring the reaction wheels are powered off in a known configuration.

- On day 262, the 11<sup>th</sup> uplink array for STEREO Behind recovery was conducted using DSS-24, 25, and 26. The uplink array was phase calibrated to provide approximate 10.4 dB gain, as compared to a single 34m station, using the Ahead observatory first for 1.9 hours then the arrayed stations were switched to point to the Behind observatory. The configuration consisted of three 34m stations at the Goldstone complex using the 80 kW, one 20 kW, and one 10 kW transmitters repeating a 3 kHz frequency acquisition sequence with the MOC sending 20 critical commands after each sweep. With the DSN 70m station DSS-43 monitoring the downlink and the Allen Telescope Array, during 2 brief TWTA sampling periods, the carrier signal was received on time with a continuously fluctuating signal of -170 dBm to -178 dBm with a period of ~45 seconds. Subcarrier lock was intermittent. While the uplink can support short critical commands, the downlink cannot support telemetry. The radio science receiver team reported a modulated downlink. As the SNR was not stable long enough for post-pass telemetry extraction, the LGA was swapped to the -Z LGA to improve SNR. This improved the carrier level by ~3 dB, with levels of -167 dBm to -174 dBm. Two telemetry frames were received. While the battery pressure was good, the battery temperature is high from overcharging and needs to be reduced.